

International Isotopes Inc.

(Including International Isotopes Idaho Inc. subsidiary)

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Cs-137 CDC.800/	CDC.700 I4	-OP-60	TBD
OVER ENCAPSU	LATION		
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Steve Laflin	1 of 7		original
PRI Signature and Date:	Document Control Signature and Date:	Quality Assurance	e Signature and Date:
DRAFT			

Procedure User Signature and Initial Log

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1.0 PURPOSE

To outline the procedure for over encapsulation of CDC.800 and CDC.700 cesium-137 source capsules and to document source measurement, leak test, and other information required on each sealed source certificate.

2.0 POTENTIAL HAZARDS

The hazards associated with the implementation of this procedure include:

- Potential exposure to radioactive material.
- Industrial hazards associated with the inspection and handling of transportation packages such as rigging, crane operations, forklift operations, pinch points, manual lifting, strains, trips, slips and falls.

3.0 APPLICABILITY AND LIMITATIONS

This procedure addresses over encapsulation of the Models CDC.800 and CDC.700 Cs-137 sealed sources in the INIS-SF-CS-1J and INIS-SF-CS-2J capsules. Only sealed sources meeting the criteria established in Section 7.4 are eligible for over encapsulation.

4.0 **DEFINITIONS**

Sealed Source – Any source that is of a design which has been successfully tested against the criteria of ANSI/HPS N43.6 or ISO 2919-1999 and is listed in the National Sealed Source and Device Registry.

Special Form – A solid form or capsule design which has been successfully tested against the criteria established in 49 CFR § 173.469 or equivalent foreign regulations.

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5.0	RESPONSIBILITIES		
5.1	I ³ Quality	•	
5.1.1	Verify this procedure is the most curr	ent revision.	
5.1.2	Ensures INIS source capsules and cap	os are within specification.	
5.1.3	Reviews completed procedure and rel	leases sources for shipment.	
5.2	I ³ Radiation Safety Officer		
5.2.1	Authorizes distribution of completed	sources.	
5.3	I ³ Technician		
5.3.1	Performs steps outlined in this proced welding of capsules and decontamina		les, assaying capsules,
6.0	Equipment and Materials		
6.1	Qualified Model CDC.800 and CDC.700	Cs-137 sealed source(s).	
6.2	INIS-SF-CS-1J and or INIS-SF-CS-2J co	mponents per I ³ drawing, DW	G.
6.3	Q-tip smears		
6.4	Leak testing apparatus		
6.5	Certificate of Analysis Template		
7.0	PROCEDURE		
7.1	Operation Supervisor (OP) verify that tec Testing) of Sealed Sources are qualified a		ng and N.D.T. (Leak
	OP Signature:		Date
	Name of Welder:	•	
Name	of N.D.T. Inspector:		
7.2	Acquire customer loading request information		
	Customer Name:	P.O. Number	
Num	ber of INIS-SF-CS-1J:	Activity per source	
Num	ber of INIS-SF-CS-2J:	Activity per source	•

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7.3 List CDC.800/CDC.700 Cs-137 source(s) to be re-encapsulated

Item	Manufacturer	Model/Serial Number	SS&D Number	Current Activity (Ci)		
1						
2						
3			en ver vierbe de vereneme en vereneme arranentes et men tre mi somme de ve verene de verene de verene de veren			
4			**************************************			
5				and the second s		
Use add	Use additional sheets as necessary					

- 7.4 Verify the CDC.800 and CDC.700 Cs-137 source(s) comply with the following:
- 7.4.1 The source is constructed from a Series 300 Stainless Steel to ensure material compatibility with the INIS Type 304 (304L, 316, 316L) S.S. outer capsule. This information should be included in the Sealed Source Safety Evaluation and/or Special Form CoC document
- 7.4.2 The source successfully passes either the wipe (smear) test or dry wipe test in accordance with ANSI/HPS N43.6-1997 Annex A Paragraphs A.2.1.1 or A.2.1.2 respectively. Attach survey records to this procedure. (Wipe test must be accomplished within 6 months of over encapsulation).
- 7.4.3 The source successfully passes either a vacuum bubble test, hot liquid bubble test or the helium pressurization bubble test in accordance with ANSI/HPS N43.6-1997 Annex A Paragraph A.2.2.1, A.2.2.2 or A.2.2.3 respectively. Attach completed leak test sheets. (Leak check must be accomplished within 6 months of over encapsulation).
- 7.4.4 The source passes a visual inspection indicating it is free of defects. (A magnification device may be used to perform this check.)
- 7.4.5 The source's outside dimensions are compatible the International Isotopes Inc. INIS-SF-CS-1J and or INIS-SF-CS-2J, verified via go-no-go fit test.
- 7.4.6 Initial the appropriate columns in the table below. Note Item numbers correspond to the Item numbers from Section 7.3.

	7.4	1.1	7.4	1.2	7.4	4.3	7.4	1.4	7.4	1.5
Item	PASS	FAIL	PASS	FAIL	PASS	FAIL	PASS	FAIL	PASS	FAIL
1					**************************************					
2										
3						THE PARTY NAMED AND ADDRESS OF				
4			·						and the refuse time the city of the city o	
5	-					To the second se				
Lice add	litional ch	eats as ne	CACCORU	interestation (in the control of the	**************************************	·	<u> </u>	······································		

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7.5 Determine INIS Source model number(s) and serial number(s). Record item from Step 7.4 that will be over encapsulated in each INIS source. NOTE, serial number is in the format of MMYY-## where -## is the next sequential number of source model number built for the current month.

INIS Model Number	Serial Number	CDC.800/CDC.700 from Step 7.4	Total Activity (Ci)	

Use additional sheets as necessary				

- 7.6 Coordinate with I³ Quality Assurance Manager to procure necessary INIS source capsules and lids
- 7.7 Coordinate with I³ Quality Assurance Manager to laser mark each source capsule with the isotope, Cs-137, INIS Model and Serial Number.

NOTE: All work with Cs-137 sources is to be performed in the clean hot cell

- 7.8 Clean the Cs-137 source capsule(s) to be over encapsulated by dipping in a 50% 50% isopropyl alcohol de-mineralized water bath and pat dry.
- 7.9 Prepare INIS capsules for welding and transfer into the Cs-137 source welding hot cell.
- 7.10 Prepare INIS Cs-137 sources in accordance with the table from Step 7.5
- 7.11 Set up welder in accordance with the weld log.
- **7.12** Weld INIS Cs-137 sources in accordance with the table from Step 7.5.

INIS Model Number	Serial Number	Qualified Welder Signature	Weld Date	
			4-	
Use additional sheets as necessary				

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7.13 Perform a leak check on the completed INIS Cs-137 source in accordance with Paragraph A.2.2.1, A.2.2.2 of A.2.2.3 from ANSI/HPS N43.6-1997. Document leak test results on Source Certificate for each source.

INIS Model / Serial No.	Test Performed	Results (Pass/Fail)	NDT Signature	Leak Test Date		
Use additional sheets as necessary						

7.14 Perform a wet Q-Tip smear of outer sealed source. Count the smear. When source smear is less than 1000 dpm, place in clean container (quart can). Document survey results in space provided below, and complete Sealed Source Certificate.

Contamination Survey Instrument Data							
The distribution of the state o			100	. •	Background	Sample	
10-0-0			da. 17 m	Count Rate	Count Time	Count time	
	Serial	Cal.	1142477	R_b	$t_{\rm s}$	t _b	MDA
Instrument	No.	Due	Efficiency	(cpm)	(min)	(cpm)	(dpm)
117711711171171			of colorada and the state of th				
			<u> </u>	THE PROPERTY OF THE PERSON NAMED OF THE PERSON			***************************************
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(B-13-(B-1				,			
$MDA = \{3 + 3.29[R_b t_s (1 + (t_s/t_b))^{1/2}]\} / \{Efficiency \times t_s\}$							

INIS Model and Serial No.	Gross Count Rate (cpm)	Net Count Rate (cpm)	Wipe Results (dpm)	Technician initial	Date
				To the state of th	
				10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	
Use additional sheets as neces	ssary	T			



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- 7.15 If sealed source is not to be removed from hot cell following smear test, then identify outside of clean container and log on Isotope Storage board all pertinent information.
- 7.16 Forward this procedure and any accompanying paperwork or certificates to Q.A. for approval.
- 8.0 REFERENCES.
- 8.1 ANSI/HPS N43.6-1997, Sealed Radioactive Sources-Classifications
- 8.2 ISO 9978 Radiation protection Sealed radioactive sources -Leakage test methods.
- 8.3 INIS Drawing, DWG No. INIS-SF-CS-040606
- 8.4 Weld Standard
- 8.5 N.D.T. Examiner Standard
- 9.0 **ATTACHMENTS**
- 9.1 Sealed Source Certificate

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Attachment 9.1



SEALED SOURCE CALIBRATION CONTAMINATION AND LEAK TEST CERTIFICATE OF CS-137 SOURCE FOR

CUSTOMER:		ACT	IVITY
I ³ MODEL NUMBER: <u>INIS-SF-CS-</u>		Ci	
SERIAL NUMBER: MMYY-##		·	TBq
REFERENCE DATE: Nº M/DD//YY Each source is manufactured by with im		pef ets 1.0 mm fall by	1.0 mm in diamete
	Physical Data		
Isotope: Cs-137 Half-life: 11018.3 days		Energy (MeV) γ ₁ 661.65	Yield 85.10%
λ: 6.29E-05 d		From Ba-	·137m
Type Removable Contamination	Method Wet Swab		sults 0 dpm
Leakage Test	Vacuum Bubble		ge Observed
NDT Class II Technician:		·	
	Signature	D	ate
NDT Class II Verifier:	Signature	. D	ate
Quality Assurance:		٥	
	Signature	D	ate
Manufacturer: ASHCROFT Model/Serial Number:: 251009AWL02L/	Leak Test Gauge Description	Calibration Date: Calibration Due Date:	4-Mar-06 Sep-06

The seller makes no warranty or representation expressed or implied, that the materials furnished under this agreement will not result in injury or damage when used for purposes authorized, or will accomplish the results for which they are requested or intended, or will not be destroyed, damaged, lost or otherwise altered in physical or chemical properties in the process of the Buyer's performance of and use of the material furnished.